



Designation: **F790–08 (Reapproved 2013) F790 – 18**

Standard Guide for Testing Materials for Aerospace Plastic Transparent Enclosures¹

This standard is issued under the fixed designation F790; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide is intended to summarize the standard test methods available on individual and composite materials utilized in fabrication of aerospace plastic transparent enclosures. As such, it is intended to specifically include transparent thermoplastics, transparent elastomers, and reinforced plastics, whether thermoplastic or thermosetting.

1.2 This guide is intended as an aid in the search for test methods pertinent to Aerospace Plastic Transparent Enclosures. It should be understood that all methods listed may not apply to all enclosures.

1.3 The standards included refer to the properties or aspects listed in **Table 1**. The properties or aspects are listed in alphabetical order and the descriptions used are intended to facilitate the search.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- C117 Test Method for Materials Finer than 75- μm (No. 200) Sieve in Mineral Aggregates by Washing
- D149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
- D150 Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation
- D256 Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
- D257 Test Methods for DC Resistance or Conductance of Insulating Materials
- D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D542 Test Method for Index of Refraction of Transparent Organic Plastics
- D543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- D570 Test Method for Water Absorption of Plastics
- D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- D638 Test Method for Tensile Properties of Plastics
- D695 Test Method for Compressive Properties of Rigid Plastics
- D696 Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer
- D746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
- D785 Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials
- D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

¹ This guide is under the jurisdiction of ASTM Committee F07 on Aerospace and Aircraft and is the direct responsibility of F07.08 on Transparent Enclosures and Materials.

Current edition approved Dec. 1, 2013 June 1, 2018. Published December 2013 June 2018. Originally approved in 1988. Last previous edition approved in 2008 2013 as F790–08: F790–08(2013). DOI: 10.1520/F0790-08R13.10.1520/F0790-18.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

TABLE 1 Property or Aspects of Aerospace Plastic Transparent Enclosures

Property or Aspect	Test Method
Abrasion Resistance	D1044
Abrasion Resistance—Oscillating Sand	F735
Abrasion Testing—Sizing Sand for	C117
Bearing Strength	D953
Bird Impact Resistance	F330
Bond Integrity	F521
Brittleness Temperature—By Impact	D746
Chemical Resistance	D543
Coefficient of Linear Thermal Expansion	D696
Compressive Properties	D695
Electrical Insulating Material—DC Resistance or Conductance	D257
Electrical Insulating Material—Dielectric Breakdown Voltage	D149
Electrical Insulating Material—Dielectric Constant	D150
Electrical Insulating Material—Flexural Properties	D790
Electrical Insulating Material—Impact Resistance	D256
Electrical Insulating Material—Rockwell Hardness	D785
Environmental Resistance	F520
Exposure Apparatus Operation—Carbon ARC Type	D1499
Exposure Apparatus Operation—Fluorescent UV Type	G154
Exposure Apparatus Operation—Xenon ARC Type	D2565
Flow Rate	D1238
Glass Transition Temperature	E1640
Hail Impact Resistance	F320
Hardness—Barcol	D2583
Hardness—Durometer	D2240
Heating Elements—Detection of Flaws	F319
Ignition Loss	D2584
Impact Resistance—Falling Weight	D5420
Impact Resistance—Falling Weight (Polycarbonate)	F736
Index of Refraction	D542
Interlayer Material Selection	F942
Light Transmissivity	F1316
Luminous Transmittance and Haze	D1003
Optical Angular Deviation	F801
Optical Angular Displacement—Multiple Images	F1165
Optical Binocular Disparity	F1181
Optical Distortion and Deviation—Double Exposure	F733
Optical Reflectivity	F1252
Peel Resistance—Floating Roller	D3167
Rubber Properties in Tension	D412
Scratches—Intensity of	F548
Shear Strength—Fusion Bonded Polycarbonate	F734
Shear Strength and Modulus—Interlayer Materials	F1362
Softening Temperature	D1525
Specific Gravity and Density	D792
Specific Heat	D2766(withdrawn)
	E1269
	E2716
Stress Craze	F791
Stress Craze	F484
Tear Resistance	D624
Tear Resistance—Initial	D1004
Tensile Properties	D638
Water Absorption	D570

- D953 Test Method for Bearing Strength of Plastics
- D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics
- D1004 Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting
- D1044 Test Method for Resistance of Transparent Plastics to Surface Abrasion
- D1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
- D1499 Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics
- D1525 Test Method for Vicat Softening Temperature of Plastics
- D2240 Test Method for Rubber Property—Durometer Hardness
- D2565 Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications
- D2583 Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
- D2584 Test Method for Ignition Loss of Cured Reinforced Resins